

National 5

Homework AP17

1. Evaluate, without a calculator

(a) $3\frac{1}{2} + 1\frac{2}{3}$

(b) $2\frac{1}{4} \times 2\frac{1}{3}$

(c) $3\frac{1}{5} \div 1\frac{1}{3}$

2. The population of a city is 435 000 at present, and is increasing at a rate of 3·2% per annum. What is the expected population in 4 years from now? Give your answer to the nearest ten thousand.

3. Two groups of students are given the same test.

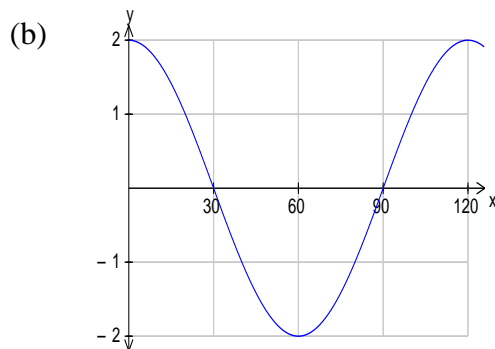
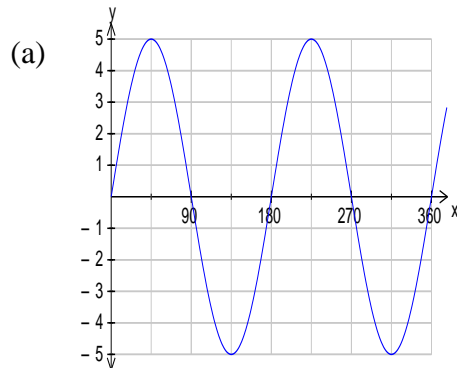
- (a) The marks of Group A are

73 47 59 71 48 62

Find the mean and standard deviation. Show working.

- (b) In Group B the mean is 60 and the standard deviation is 29·8.
Compare the results of the two groups.

4. Find the equation of each of these trig graphs.



5. Solve by factorisation

(a) $5x = x^2$

(b) $2x^2 - 5x - 3 = 0$

6. A ship leaves port P and sails a distance of 20 km on a bearing 059° , reaching port B. At B, the ship changes direction and sails for 25 km on a bearing of 132° to port C.

- (a) Draw a sketch to show this information.
(b) Calculate the direct distance from P to C.

7. Solve:

(a) $2 + 5x \leq 8x - 16$

(b) $2x > 3 - (x + 6)$

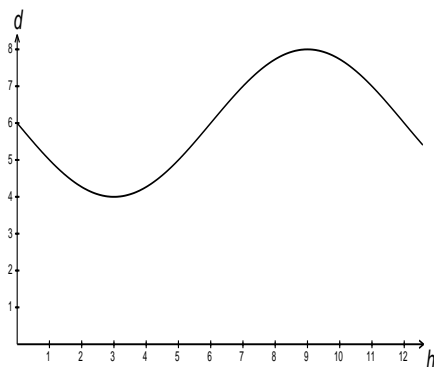
(c) $\frac{m}{3} = \frac{(1-m)}{5}$

(d) $2y - \frac{(3y-1)}{4} = 4$

8. (a) A cylindrical water urn has radius 24 cm and height 60 cm.
Calculate its volume in cubic centimetres.
- (b) Another urn has height 50 cm and the same volume. Find its radius.

9. The depth, d metres, of water in a harbour entrance over a 24 hour period starting at midnight is given by the formula $d = 6 - 2 \sin 30h^\circ$, where h is the number of hours after midnight.

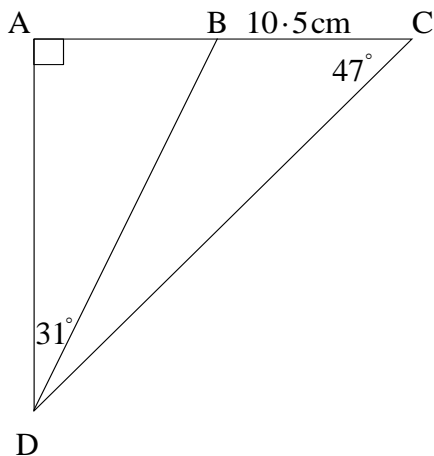
The graph below shows the depth of water in the harbour entrance for the first 12 hours of the 24 hour period.



A fishing boat, needing a depth of 5 metres, wants to dock in the harbour.

Find, algebraically, the times over the **24 hour period** during which the boat can pass through the harbour entrance.

10. In the diagram below, $BC = 10.5$ cm.
Calculate the length of AD .



11. (a) The estimated population of gulls on an island is 12000.
If the population increases at 6% p.a., estimate the population 4 years from now, rounding your answer to 2 significant figures.
- (b) The price of an article, including 32% profit, is £316.80.
Calculate the price before the profit is added.